A RESEARCH AGENDA ON MANAGERIAL INTENTION TO GREEN IT ADOPTION: FROM NORM ACTIVATION PERSPECTIVE

Chun Fong Lei, Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, P. R. China, 10900544r@connect.polyu.hk

E. W. T. Ngai, Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, P. R. China, eric.ngai@polyu.edu.hk

Abstract

Green IT adoption is a plausible attempt for organizations to tackle the current environmental problem, and can also improve the economic performance of an organization. Therefore, organizational adoption of Green IT is beneficial to the society. Investigating how the decision maker in an organization would come to adopt Green IT is necessary to establish strategies in promoting organizational adoption of Green IT adoption because decision makers make decisions, rather than organizations. However, to our knowledge, studies in Green IT literature seldom investigate this area.

In Green IT literature, emphasis has been given on the effects of institutional pressures and organizational resources on organizational adoption of Green IT. The current study adapts a Norm Activation Model in organizational context to investigate on how an intention to Green IT adoption is formed. The decision makers’ personal norm on environmental interpretation is argued to be activated when environmental preservation is interpreted as an opportunity, which may lead to intention to Green IT adoption. Perceived competitive advantage of Green IT will affect how environmental preservation is interpreted, as well as affect intention to Green IT adoption. Moreover, discretionary slack will also affect how environmental preservation is interpreted. All of these should be tested empirically to see if the results support our proposed hypotheses. Empirical data for this study will be collected via a survey.

Keywords: Green IT, Norm Activation Model, Personal Norm, Intention, Managerial Interpretation, Adoption
1 INTRODUCTION

Green information technology (IT) is defined as a "systematic application of ecological-sustainability criteria, such as pollution prevention, product stewardship, and use of clean technologies, for the creation, sourcing, use, and disposal of IT technical infrastructure, as well as within the human and managerial components of the IT infrastructure" (Molla et al., 2011, p. 73). Given that business activities related to IT is a big contributor to the deteriorating environment, and IT can also serve as the solution to enhance business processes (Elliot, 2011), adopting Green IT is crucial for an organization. There are a number of studies attempted to determine the antecedents of Green IT adoption (Lei & Ngai, 2013). Different from the previous studies which attempts to determine the antecedents that would directly drive the organizational adoption of Green IT (e.g., Butler, 2011; Dao et al., 2011), this study attempt to investigate how an organizational decision maker, such as chief executive officer (CEO) and chief information officer (CIO) will intent to adopt Green IT in his/her organization.

We believe that the investigation of the managerial intention to organizational Green IT adoption is important because of the following two reasons. The first reason is that “[o]rganizations do not make decisions – [but] individual do” (Liedtka, 1991, p. 543). Although there are factors driving an organization to adopt Green IT, the final decision on Green IT adoption is still made by organizational decision makers. According to the belief-action-outcome framework for information systems research on sustainability (Meilville, 2010), both organizational structure and socialization will affect organizational outcomes and environmental performance through the combined actions of individuals, such as Green IT adoption. Therefore, the role of individual decision maker in Green IT should not be ignored. The second reason is that decision makers in the managerial level play an important role in the Green IT adoption. A number of studies show that champion on Green IT is an important driver of organizational Green IT adoption (e.g., Bose & Luo, 2011; Jung et al., 2011; Kuo & Dick, 2010; Mithas et al., 2010; Nedbal et al., 2011; Sayeed & Gill, 2009; Seidel et al., 2010). A champion on Green IT refers to a person at managerial level who would like to implement Green IT in his/her organization, and would provide resources and supports through the process of Green IT adoption (Bose & Luo, 2011). The investigation of the managerial intention to organizational Green IT adoption is important for us to understand the formation of champion on Green IT; thus, it is necessary to begin with investigating the decision making process of organizational decision makers. In this study, norm activation model (NAM) is adapted to investigate the forming of intention to Green IT adoption. Therefore, this study would try to answer the following research questions: 1. What factors affect a decision maker’s intention to organizational Green IT adoption, and; 2. does the influence of personal norm in predicting the intention to adopt Green IT change as environmental preservation is interpreted differently?

2 LITERATURE REVIEW AND RESEARCH MODEL DEVELOPMENT

2.1 Green IT Initiatives Identified in the Literature

Green IT is an umbrella term covering a range of initiatives. We identified the Green IT initiatives from the Green IT literature. To provide a broader picture of Green IT initiative, Green IT initiatives are categorized into the following groups: hardware reduction and reconfiguration, pro-environmental policies and practices in IT usages, and IT enabled practices. The identified Green IT initiatives are listed in Table 1.

<table>
<thead>
<tr>
<th>Category of Green IT Initiatives</th>
<th>Green IT Initiatives</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware reduction and reconfiguration</td>
<td>Virtualization</td>
<td>Bose &amp; Luo, 2011; Harman et al., 2010; Iacobelli et al., 2010; Mann et al., 2009</td>
</tr>
</tbody>
</table>
Table 1. Green IT Initiatives Identified from the Literature

<table>
<thead>
<tr>
<th>IT Enabled Practices</th>
<th>Pro-environmental Policies and Practice in IT Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin Client Computers</td>
<td>Extended Desktop and Laptop Lifecycle</td>
</tr>
<tr>
<td>Data Center Reconfiguration</td>
<td>Power and Workload Management Software</td>
</tr>
<tr>
<td>Telecommuting and Teleconferencing</td>
<td>Policies that Encourage Purchasing Products on an IT Vendors’ End-of-life/Recycling Program</td>
</tr>
<tr>
<td>Paperless Policy</td>
<td>Policies that Encourage Disposing of IT Equipment in an Environmentally Friendly Manner</td>
</tr>
</tbody>
</table>

2.2 Models for Pro-environmental Behaviors

Since Green IT adoption is an environmental preservation practice, we briefly review the theories that have been widely used in predicting pro-environmental behavior and decision making. There are three types of models commonly used to predict an individual’s pro-environmental behavior or decision.

2.2.1 Rational Economic Models

Rational economic models assume that people are self-interested, and their actions are their means to maximize their own benefits (Bamberg & Möser, 2007). Therefore, they argue that an individual’s pro-environmental behaviors are driven by the focal person’s desire to gain personal benefits through pro-environmental behaviors.

Generally, rational economic models, such as theory of reasoned action and theory of planned behavior, are generalized models, which are not specifically designed for explaining the behavior or decision on performing any specific type of behaviors. Therefore, their explanation power would be rather limited. Rational economic models are widely used in predicting the decision on performing different type of behaviors, such as, unethical behavior (Chang, 1998), technology adoption (Mathieson, 1991), leisure behavior (Ajzen & Driver, 1992), recycle behaviors (Mannetti et al., 2004), usage of public transportation (De Groot & Steg, 2007; Heath & Gifford, 2002), general pro-environmental behavior (Harland et al., 1999), car usage (Bamberg & Schmidt, 2003) and general transportation behavior (Kaiser et al., 1999).

2.2.2 Affects Models

When compared rational economic models, affects models are rather exploratory and not theory driven (Steg & Vlek, 2009). Therefore, it is difficult to identify a representative example of affect models. The affects models argue that people’s pro-environmental behaviors and decisions are driven by their personal affects, rather than the cost-benefit evaluation or personal obligation. In the literature, affect can be referred to sympathy (Allen & Ferrand, 1999), emotional affinity (Kals et al., 1999), affective motive (Steg, 2005), and empathy to the nature (Schultz, 2000). Generally, sympathy would lead to a person’s pro-environmental behavior (Allen & Ferrand, 1999). However, affects may also lead to behaviors which are harmful to the environment. For example, individuals with high affective
motive of using private cars will be likely to private cars than other individuals (Steg, 2005). According to the study conducted by Schultz (2000), a person’s empathy to the nature can be manipulated. This provides practical implications to practitioner to establish policy to promote pro-environmental behaviors through the manipulation of personal affects.

2.2.3 Norm Activation Model

NAM, the most widely applied model in predicting individual pro-environmental behavior (Harland et al., 2007), assumes that people's pro-environmental or pro-social behaviors are driven by their personal norm, rather than the evaluation cost and benefit or personal affect. Personal norm is a set of self-set moral standard on what ought to be done or not (Perugini et al., 2003). Personal norm guides a wide range of personal behavior and organizational outcomes (Corraliza & Berenguer, 2000; Ehrhart & Naumann, 2004). Moreover, personal environmental norm is the most dominant predictor of environmental friendly behaviors compared with other predictors (Minton & Rose, 1997).

A personal norm will not affect a person's behavior, unless the personal norm is activated. A personal norm will be activated when (1) the consequence of the future action is realized and (2) the person admits the responsibility of both the behavior and consequence (Schwartz, 1974). If the consequence of future action is perceived as harmful, and the person admits the responsibilities, a sense of guilt will emerge because the attribution of harmful consequence does not match the person's personal norm (Bamberg & Moser, 2007). When the sense of guilt guided by the personal norm appears, the person will take action to eliminate or compensate the sense of guilt. Thus, the sense of guilt is an essential element to activate personal norm.

2.3 Reasons to Adapt Norm Activation Model

According to our literature review, there is no research model developed for explaining the formation of an organizational decision maker’s intention to organizational Green IT adoption. Although Gholami et al. (2013) have studied the Green IT adoption through perspective of individual managers, it focuses on the outcomes of individual managers’ attitudes towards Green IT adoption, such as environmental performance, and the investigation on the formation of individual’s attitude is limited (only one antecedent identified). Therefore, we planned to adapt the NAM to explain the formation of an organizational decision maker’s intention to adopt Green IT in his/her organization, rather than using the well-established individual technology adoption models, such as technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), or diffusion of innovation (DoI) theory because Green IT is different from traditional IT. TAM, UTAUT and DoI theory are generalized model which are not specifically designed for explaining a specific type of technologies. They assumed that the adoption of IT is based on the cost-benefit evaluation. For example, in TAM, a person’s intention to adopt a particular technology is affected by the perceived usefulness (benefit) and the ease of use (cost) of adopting the technology (Davis, 1989). However, Green IT is not only a group of technologies, but also a set of pro-environmental practices. Since the implementation pro-environmental practices involve value judgments, and it is not best predicted by cost-benefit evaluation (Minton & Rose, 1997), well-established individual technology adoption models are not the best candidate to explain the organization adoption of Green IT. We believe that NAM will be a better theoretical model for explaining the organizational Green IT adoption, since it incorporates both value judgment (personal norm) and cost-evaluation (managerial interpretation).

2.4 Personal Norm and Green IT Adoption

In this study, personal norm refers to an organizational decision maker’s self-set standard on the relationship between business and natural environment, i.e., what a business should do or should not do to the natural environment. Regardless of the level of salience, senior executives should have a set of personal norm on what a business ought to do to protect the environment (Klassen, 2001). Beyond the relationship between personal norm and individual behavior, supports on the relationship between personal norm and behavior have also been found at the organization context (Gagnon et al., 2003; Guo & Yuan, 2012). In this study, personal norm on environmental preservation will drive the
decision maker’s intention to adopt Green IT because a decision maker can use Green IT adoption to protect the environment and achieve environmental sustainability. However, personal norm might not be relevant in the organizational adoption of other kinds of IT, as the adoption of other kinds of IT does not involve, value judgment, i.e., judgment on environmental preservation.

**H1: Higher level of personal norm on environmental preservation will lead to higher level of intention to Green IT adoption.**

### 2.5 Managerial Interpretation and Norm Activation

Despite the supporting evidence mentioned, some studies failed to support the positive relationship between personal norm and decision in the organizational context (e.g., Flannery & May, 2000). This failure brings out the question that in what situation a personal norm will lead to related behaviors in the organizational context. In reality, the unethical decisions are not always attributed to individual decision makers (McKenna, 1996). A person’s personal values and norms may be discarded if a person has strong identification to his or her organization (Etizon, 2007). The reason may be due to the sense of guilt was suppressed, which would emerge when there is a gap between personal norm and the actual situation, when the decision maker thinks it is not feasible to conduct the behavior according to his/her personal norm and it is not his/her fault. This might explain why some studies failed to find support for the positive relationship between personal norm and decision in the organizational context. When there are some factors, i.e., norm activator/de-activator which would probably suppress a person’s sense of guilty for not behaving according to personal norm, the personal norm will not able to guide the actions or decision of the individual anymore.

Managerial interpretation may serve as norm activator/de-activator. Decision makers’ managerial interpretation on environmental preservation can either be interpreted as a threat or an opportunity (Jackson & Dutton, 1988). Given in the situation that environmental preservation is interpreted as a threat and seems less feasible, the sense of guilt may be suppressed, although the current situation does not match the decision maker’s personal norm. However, when environmental preservation is interpreted as an opportunity and seems feasible, the sense of guilt will be more likely to emerge when there is a gap between the situation and personal norm.

**H2: When environmental preservation is interpreted as an opportunity, higher level of personal norm on environmental preservation will lead to higher level of intention to Green IT adoption; when environmental preservation is interpreted as a threat, the relationship between personal norm on environmental preservation and intention to Green IT adoption will not be significant.**

### 2.6 Competitive Advantage and Intention to Green IT Adoption

In the long term, it is not realistic to declare that the pro-environmental decision of an organizational decision maker is solely driven by altruistic motive and moral obligation to environmental preservation, which is also driven by potential benefits (Schaefer, 2007). The decision making in organizational IT adoption are often determined by perceived competitive advantages of the focal IT (e.g., Liang et al., 2007). Apart from helping an organization to achieve higher environmental performance, Green IT adoption can also lead to a number of competitive advantages in economic performance, for example, cost reduction, such as reduction in energy consumption, waste discharge and fine for environmental accidents (Butler & Daly, 2009; Elliot & Binney, 2008; Mann et al., 2009; Sayeed & Gill, 2008), as well as organizational image enhancement (Butler & Daly, 2009).

Due to the profit seeking nature of businesses, it is reasonable to predict that as the higher level of economic and environmental benefits of Green IT adoption are expected, decision makers will be more likely to decide to adopt Green IT in their organizations.

**H3: The higher level of perceived competitive advantage of Green IT will lead to higher level of intention to Green IT adoption.**
2.7 Competitive Advantage of Green IT, Discretionary Slack and Managerial Interpretation

Whether a focal issue is interpreted as an opportunity or threat depends on the evaluation on the following attributes: negative-positive, loss-gain, and uncontrollable-controllable (Sharma, 2000), which represent the decision makers’ affective responses to, evaluation on the potential gain or loss in, and self-efficacy in controlling the possible outcomes of the focal issue (Jackson & Dutton, 1988). Practically, the three attributes are highly correlated, although not perfectly (Jackson & Dutton, 1987). Therefore, positive, gain and controllable usually come together whereas negative, loss and uncontrollable usually comes together. Holding other factors constant, the focal issue will be perceived as an opportunity when it is perceived as positive gain and controllable, whereas the focal issue will be perceived as a threat when it is perceived as negative, loss and uncontrollable. We argue that the perception of the competitive advantage of Green IT will positively affect an organizational decision maker’s managerial interpretation on environmental preservation because of the follow arguments. For the negative-positive continuum, since the perceived competitive advantage of Green IT gives an organizational decision maker a message that the improvement of environmental performance does not necessary lead to lower economic performance through the adoption of Green IT (Watson et al., 2010), the decision maker should have a positive affective response to the competitive advantage of Green IT is perceived. For the loss-gain continuum, since the perceived competitive advantage of Green IT gives an organizational decision maker a message that economic performance can be improved through the adoption of Green IT, an environmental preservation practice, such as cost reduction (Kuo & Dick, 2010), the decision maker would be likely to perceive environmental preservation as gainable. For the uncontrollable-controllable continuum, the perceived competitive advantage of Green IT gives an organizational decision maker an expectation that environmental preservation will be more welcomed by other stakeholders, as environmental preservation through Green IT adoption will be beneficial to the organization. Therefore, the organizational decision maker would expect less constraint from the stakeholders on the issues of environmental preservation.

H4: The higher the level of perceived competitive advantage of Green IT, the higher the likelihood that environmental preservation will be interpreted as an opportunity; The lower the level of perceived competitive advantage of Green IT, the higher the likelihood that environmental preservation will be interpreted as a threat.

The extent of discretionary slack in an organization will affect how a decision maker interprets a managerial issue. Discretionary slack refers to the surplus of organizational resources which can be freely allocated by the focal decision maker (Sharma, 2000). Environmental preservation will be more likely interpreted as opportunities, rather than threats, when there is enough discretionary slack (Sharma, 2000) because discretionary slack allow managers to implement more search, provide more opportunities on innovation to tackle the issues, and respond rapidly on the changing environment (Bowen, 2002).

H5: The higher the extent of discretionary slack, the higher the likelihood that environmental preservation will be interpreted as an opportunity; The lower the extent of discretionary slack, the higher the likelihood that environmental preservation will be interpreted as a threat.

2.8 Control Variables

Institutional pressures, including mimetic, normative, and coercive pressure, will also be controlled because they are positively related to the adoption of Green IT (Chen et al., 2009). Those institutional pressures have already included the pressures from governmental regulations and industrial standard. Social desirability will be controlled because the responses of studies on ethical or moral judgment may potentially be influenced by social desirability bias (Aquino, 2000); this study involves self-reporting scales. Environmental uncertainty will be controlled because it affects decision making in adopting green practices in an organization, but with mixed results (Lin & Ho, 2011). The type of ownership will be controlled. Publicly owned organizations have diffused control, whereas privately
owned organizations have concentrated control (Boot et al., 2006). The diffusion of control may suppress a decision maker’s intention to Green IT adoption.

Figure 1. Schematic Diagram of the Proposed Model

3 FUTURE RESEARCH

The research model would be tested using empirical data; the results will be reported in future publications. Data will be collected by conducting a survey to the decision makers responsible for establishing IT strategies in organizations in different industries, such as, IT department manager, CIO or CEO, etc.

3.1 Proposed Measurement – Criterion Variable and Predictor Variables

For the criterion variable, intention to Green IT adoption, the measurement is a 3-item 7-point Likert scale question adapted from the study by Khalifa & Davison (2006). Respondents select answers from “strongly disagree” to “strongly agree.” A sample item is, “I am likely to adopt Green IT in our company within the next two years”. For the predictor variables, all the questions are 7-point Likert scale questions. Unless specified, the respondents select answers from “strongly disagree” to “strongly agree.” Personal norm is measured by a 5-item scale, which was also used by Klassen (2001). A sample item is, “Businesses need to spend more money on environmental protection”. A 5-item scale used by Sharma (2000) was employed to measure managerial interpretation. A sample item will be, “I am likely to lose rather gain by actions to preserve the environment”. Competitive advantage of Green IT is measured by a 3-item scale, which was adapted from the study by Lin and Ho (2011). A sample item is, “The Green IT can provide better environmental performance”. Discretionary slack will be measured by a 2-item scale, which was also used by Sharma (2000). Respondents select answers from very low to very high. “Extent of discretion in investment of resources for environmental decisions” is a sample item.

3.2 Proposed Measurement – Control Variables

Measurements of mimetic, normative, and coercive pressures will be adapted from the paper of Liang et al. (2007). The sample items of mimetic, normative, and coercive pressures are, “Our main competitors who have adopted Green IT have greatly benefited”, “The extent of Green IT adoption by your company’s suppliers”, and “The local government requires our company to adopt Green IT”, respectively. All of which are 3-item 7-point Likert scale. Measurements of environmental uncertainty will be a 5-item 7-point Likert scale used by Becker & Knudsen (2005). A sample item is, “We think that the handling of environmental problems is connected with such great uncertainty that we ought to await what happens in the future”. Measurement of social desirability will be a 13-item 5-point Likert scale used by Reynold (1982). A sample item is, “I’m always willing to admit it when I make a mistake”. Type of ownership will be assessed by asking whether the company is publicly-owned or privately owned. Lai and Wong (2012) have adopted a similar measurement.
3.3 Common method bias

As most of the data are self-reported, this research study may potentially suffer from common method bias (Podsakoff et al., 2003). To deal with the problem, both procedural, and statistical and post hoc remedies would be employed in this research study (Podsakoff & Organ, 1986).

3.3.1 Procedural Remedies

Since the response rate of the survey is not expected to be very high, this is not very realistic to use temporal separation, collect the data in several phases in this research study. In the cover letter of the survey, the anonymity of the respondents is promised to be protected. Moreover, the respondents are told that there is no definite right or wrong answer in the questionnaire (Podsakoff et al., 2003). The items in the questionnaire will be improved by conducting pilot test.

3.3.2 Statistical and Post hoc Remedies

For of all, Harman’s single-factor test will be conducted. An exploratory factor analysis will be conducted without rotation. If only one single factor is detected in the analysis, or a single factor accounts for most of the covariance among the items, common method will be a serious problem. Moreover, both single-specific-method factor approach and partial correlation procedure will be used in to assess the seriousness of the common method bias in this research study (Podsakoff et al., 2003). For the single-specific-method factor approach, both controlling for the effects of a directly measured latent method factor and controlling for the effects of an unmeasured latent method factor will be used. For the method of controlling for the effects of a directly measured latent method factor, the items will be allow to load on their corresponding theoretical constructs, as well as on social desirability. The significance of the loadings of the social desirability will be assessed. If the loadings are not significant, this will provide evidence that common method bias is not a serious problem in the research study. For the method of controlling for the effects of an unmeasured latent method factor, the items will be allow to lead on their corresponding theoretical constructs, as well as a latent common method variance factor. The significance of the loadings of the unmeasured latent method factor will be assessed. If the loadings are not significant, this will provide evidence that common method bias is not a serious problem in the research study. PLS software will be used to conducted these two analyzes (Liang et al., 2007). For the partial correlation procedure, the effect of social desirability will be controlled as the construct social desirability will be linked to both the predictor and criterion constructs.

4 CONCLUSIONS

In this research-in-progress paper, we have developed a theoretical model to explain why organizational decision makers will intent to adopt Green IT in his/her organization. We expect that the research model will be able to fill the theoretical gap that the formation of organizational champion of Green IT is unknown, and the lack of attention in how an organizational decision maker come up with the decision to adopt Green IT in his/her organization. Up to now, 220 responses were collected and the data collection process is still undergoing.

5 ACKNOWLEDGEMENTS

The authors are grateful for the constructive comments of the referees on an earlier version of this paper. This research was support in part by a grant from the Central Policy Unit of the HKSAR (project number:K-QZ1A).
References


